

**LECTOTYPE DESIGNATIONS AND HOLOTYPES FOR  
BEES OF THE GENUS *HYLAEUS* (*NESSOPROSOPIS*)  
DESCRIBED FROM THE HAWAIIAN ISLANDS  
(HYMENOPTERA: COLLETIDAE)**

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*Abstract.*—Lectotypes are designated for 44 species, and holotypes are identified for 13 species, of *Hylaeus* (*Nesoprosopis*) that were described by T. Blackburn, W. F. Kirby, R. C. L. Perkins, F. Smith and P. H. Timberlake during the period 1853–1926. The types are located in The Natural History Museum, London, and Bernice P. Bishop Museum, Honolulu.

*Key Words.*—Insecta, Hymenoptera, Colletidae, *Hylaeus*, *Nesoprosopis*, Hawaiian bees, lectotypes

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The native bees of the Hawaiian Islands, all members of the genus *Hylaeus*, subgenus *Nesoprosopis*, were described by Blackburn (1886), Kirby (1880), Cockerell (1926), Perkins (1899, 1910, 1911), Smith (1853, 1879a), and Timberlake (1926). Except for Timberlake, the other authors failed to explicitly identify the holotypes for their proposed species group names. In advance of a revision of these native bees, I have sought to identify the holotypes and have designated lectotypes from types series where more than one specimen was indicated in the description. To assist in the future recognition of the types, wing length was taken as the distance from the base of the costal vein to the maximum curve of the wing tip. Some wings were bent and others had the tip damaged. The best wing was measured and recorded "as is." Locality data and date of collection are recorded from the specimen labels. Each holotype and each new lectotype has my red label. At The Natural History Museum, London, each holotype also has a red-rimmed label uppermost that reads "Holotype," and each lectotype has a purple-rimmed label uppermost that reads "Lectotype." Paralectotypes will be labeled.

1. *Species group names proposed by Rev. Thomas Blackburn.*—The same descriptions were published in Blackburn (1886, 1887). Perkins (1911: 719) stated that he had acquired the Blackburn collection with a number of types. Types for three of the species are now in the Bishop Museum, but the type series of *P. rugiventris* Blackburn (1886: 146) has not been located. Blackburn used a graphic code on the mounting card to indicate the island on which a specimen was taken. The key to the codes can be found handwritten opposite entry "79-40" in Anonymous (1864–1881) and in Zimmerman (1957: 201). He also used a numeric code. A key to some numbers appears in a letter (Blackburn 1880; see also below under W. F. Kirby and F. Smith), but the meanings of the numbers for the species immediately below are unknown.

*Prosopis coniceps* Blackburn (1886: 145). Holotype male; wing length 6.5 mm; mounting card has Blackburn's code for Hawaii (line with a circle in the middle),

on the under side of the card is written in pencil "82," another word marked out, and a word which is illegible except for the letters "M-u-K" presumably corresponding to Mauna Kea cited in the publication; "Type," "coniceps, Blackb.," "Haw. Is. Coll. Blackburn," and the Bishop Museum label for Type No. 2339.

*Prosopis kona* Blackburn (1886: 144). Lectotype male here designated; wing length 3.6 mm (distance to distal end of marginal cell, wing tip missing); a piece of paper has Blackburn's code for Hawaii and "125;" "Type," "kona, Blk.," "Haw. Is. Coll. Blackburn," and the Bishop Museum label for Type No. 2595.

*Prosopis satelles* Blackburn (1886: 140–141). Holotype male; wing length 6.5 mm (tip damaged); a piece of paper has Blackburn's code for Maui in pencil (line crossed by one oblique line) and "115;" "Type," "satelles Blk.," "Haw. Is. Coll. Blackburn," and the Bishop Museum label for Type No. 2340.

The specimen corresponds to the description except that it is only 9 mm long, not 11 mm as stated in the description. The original description on page 140 is of "*satellus*," but "*satelles*" appears in the key on page 148. The latter is correct as a noun in apposition and was used consistently by the next reviser (Perkins 1899, 1910).

2. *Species group name proposed by T. D. A. Cockerell.*—The types of *Nesoprosopis fuscipennis swezeyi* Cockerell (1926: 308–309) have not been located.

3. *Species group name proposed by W. F. Kirby.*—

*Prosopis flavifrons* Kirby (1880: 85). Holotype male; wing length, 3.72 mm; specimen mounted on a card with "24" written in ink beside it on the card, "Cameron 99-30," "Prosopis flavifrons, E. M. M. XVII.85," and on back of label, "Hawaiian Isles, Kauai, Blackburn (24)," round label with blue rim, "Syntype"; B. M. Type Hym. 17a 170.

In his description, Kirby does not indicate the sex of the specimen described or the number of specimens examined. The description clearly is of a male. In Kirby's paper, Blackburn is quoted: "Taken at flowers on Kauai, very sparingly," indicating that Blackburn had collected more than one specimen. However, other evidence indicates that only one specimen was seen by Kirby. Earlier, Blackburn had sent specimens of Hawaiian aculeates to F. Smith at the British Museum (Natural History). The native bees in the shipment were listed under six manuscript names in accession "79-40" (Anonymous 1864–1881). Smith died, but his manuscript with five of the names for native bees was duly published by the Trustees of the British Museum (Smith 1879b). The single bee corresponding to the sixth entry, "*P. carbonaria*," was not. In the preface to the volume, it is stated that ". . . the only alterations admitted by the Editor were those of some specific names which were found to be preoccupied for species of the same genus." Kirby, in his description of *Prosopis flavifrons* wrote: "This species is ticketed, *carbonaria* Smith; but I cannot find that it has been described; and the specific name has already been used in the genus." The number "24" on the label refers to Blackburn's field notes and also is mentioned in Kirby's paper. After Smith's death, Blackburn (1880) wrote, apparently to Kirby, "Prosopis no. 24 This appears to be omitted altogether. It is allied to Blackburni and facilis, & is from Kauai. 1



*was sent.*" (italics added here). Therefore, Kirby must have seen only the single specimen marked "24" that was initially assigned the name *carbonaria* by Smith and whose description was deleted from Smith's manuscript because the Editor discovered the name was preoccupied. Of the other label entries, "Cameron 99-33" refers to the accession of Hymenoptera purchased from P. Cameron who presumably had acquired the Blackburn specimen after Kirby's publication. "E. M. M. XVII.85" refers to Kirby's paper.

4. *Species group names proposed by R. C. L. Perkins.* — The dates of publication for Perkins' contributions to the *Fauna Hawaiiensis* are from Manning (1986). Hawaiian bees collected by Perkins can be found in roughly equal numbers in The Natural History Museum in London, The Hope Entomological Collection at Oxford University, and in the Bishop Museum. Although Perkins' collection of British aculeates is at the University Museum of Zoology at Cambridge University, no Hawaiian specimens are included.

Perkins' types are conveniently treated in two groups: those proposed in volume 1 of the *Fauna Hawaiiensis* and those proposed later. For the first group, candidate types were found in The Natural History Museum, London, for all his names. In selecting the lectotypes for these names, I have tried to honor what I assume to be Perkins' choice of type specimens. Perkins explicitly mentions his choice of types only in the description of *N. obscurata*, but the word "Type" appears on labels of specimens that are consistent with his descriptions. When both were available, a male and a female were so labeled with the word "Type" handwritten in black ink directly on the paper cover of the cork mounting block or imprinted on a label glued to the block. With certain qualifications noted under the species names, lectotypes were chosen according to the following additional criteria: (1) the collection locality and, when given, the date in the description corresponded to that of the specimen; (2) the labels on the specimen indicated that it was collected and identified by Perkins and the specimen usually had the accession label "Hawaiian Islands, R. C. L. Perkins, 98-60" for Hymenoptera collected by Perkins; (3) the specimen corresponded to the description; and (4), when both sexes were available, the male was chosen because they exhibit greater morphological diversity. Alternate specimens from the type series were chosen for lectotypes of *N. kauaiensis* and *N. laticeps* because Perkins' choice of male types had the heads missing.

In some cases, more information about the collection locality and ecology is given in the description than appears on the specimen label. The specimens were initially assigned field numbers corresponding to Perkins' notes. Unfortunately, at least for the bees, the field number was discarded when it was replaced by a printed label bearing geographic place names, elevation, Perkins' name, and date. The additional information in Perkins' publications must have been from his notes. Some geographic place names on the specimen labels are less precise than those in the descriptions. For example, the lectotypes of *N. erythrodermas*, *N. inquilina*, *N. insignis*, *N. rugulosa*, *N. setosifrons*, and *N. volcanica* have "Kau," a large district on Hawaii, on their specimen labels while in the descriptions "Kilauea" is given, referring to the vicinity of the active crater. Finally, some obvious errors were discovered by Manning (1986: 32) who notes that Perkins could not have collected *Nesoprosopis* on Oahu in February 1892 because, according to her carefully documented itinerary, he was enroute to Hawaii from

England. No types were alleged to have been collected during that period and all other dates correspond to her itinerary for Perkins.

The search for types of the second group of names (i.e., those proposed after volume 1 of the *Fauna Hawaiiensis*) has been less successful. Type series, but no specimens labeled "Type," have been found for *Nesoprosopis ombrias* and *N. psammobia*. Lectotypes for these are designated below. However, no specimens likely to be types or members of a type series have been located for *N. filicum* Perkins (1911: 722), *N. homoeochroma* Perkins (1911: 722), *N. hula* Perkins (1911: 721), and *N. pele* Perkins (1911: 723).

*Nesoprosopis andrenoides* Perkins (1899: 111). Lectotype female here designated; wing length, 7.61 mm; "Waimea, Kauai, 2000 ft, Perkins, 2.1897"; B. M. Type Hym. 17a 145.

*Nesoprosopis angustula* Perkins (1899: 95–96). Lectotype male here designated; wing length, 4.02 mm; "Mts. Koele, Lanai, 2500 ft, Perkins, 1.1894"; B. M. Type Hym. 17a 150a.

*Nesoprosopis anomala* Perkins (1899: 112–113). Holotype female; wing length 5.60 mm; "Honolulu, Oahu, 2000 ft, Perkins, 2.1897"; B. M. Type Hym. 17a 146.

*Nesoprosopis assimulans* Perkins (1899: 101–102). Lectotype male here designated; wing length, 5.61 mm; "Mts. Koele, Lanai, 2000 ft, Perkins, 1.1894"; B. M. Type Hym. 17a 165a.

*Nesoprosopis assimulans oahuensis* Perkins (1899: 102). Lectotype male here designated; wing length, 5.36 mm; "Waianae, Oahu, Perkins, 1.1897"; B. M. Type Hym. 17a 166b.

*Nesoprosopis caeruleipennis* Perkins (1899: 107). Lectotype male here designated; wing length, 7.86 mm; "Molokai Mts., Perkins, 12 VI.1893"; B. M. Type Hym. 17a 138a.

*Nesoprosopis chlorosticta* Perkins (1899: 78–79). Lectotype male here designated; wing length, 4.40 mm; "Waimea, Kauai, 2000 ft, Perkins, 2.1897"; B. M. Type Hym. 17a 156b.

*Nesoprosopis comes* Perkins (1899: 90–91). Lectotype male here designated; wing length, 4.72 mm; "Haleakala, Maui, 5000 ft, Perkins, X.1896"; B. M. Type Hym. 17a 161a.

*Nesoprosopis connectens* Perkins (1899: 85–86). Lectotype male here designated; wing length, 4.28 mm; "West Maui Mts., Iao Valley, Maui, Perkins, IV.1894"; B. M. Type Hym. 17a 121.

*Nesoprosopis crabronoides* Perkins (1899: 94). Lectotype female here designated; wing length, 3.71 mm; "638," "Type (female symbol)," "98-60," and identified as *Nesoprosopis crabronoides* Perkins; B. M. Type Hym. 17a 2752.

The number "638" appears under the card on which the bee is mounted. This was the lot number assigned by Perkins (1895–1897): "638. Kilauea, Hawaii IX.'95." At the time of writing the lectotype was not labeled with the B. M. type number, but that number was assigned to this name.

*Nesoprosopis difficilis* Perkins (1899: 80–81). Lectotype male here designated; wing length, 4.72 mm; "Kau, Hawaii, 4000 ft, Perkins, XII.1896"; B. M. Type Hym. 17a 159b.

*Nesoprosopis dimidiata* Perkins (1899: 96). Lectotype male here designated; wing



length, 3.33 mm; "Kona, Hawaii, 4000 ft, Perkins, 8.1892"; B. M. Type Hym. 17a 149.

*Nesoprosopis dumetorum* Perkins (1899: 92–93). Lectotype male here designated; wing length, 3.71 mm; "Puna, Hawaii, 2000 ft, Perkins, XI.1896"; B. M. Type Hym. 17a 163a.

*Nesoprosopis erythrodemas* Perkins (1899: 112). Holotype female; wing length 7.8 mm (tip damaged); "Kau, Hawaii, 4000 ft, Perkins, IX.1895"; B. M. Type Hym. 17a 147.

*Nesoprosopis finitima* Perkins (1899: 100). Lectotype female here designated; wing length, 4.96 mm; "Kauai, Perkins, VI.1894," handwritten: "N. finitima, Type (female symbol)"; B. M. Type Hym. 17a 168.

The male mentioned in the description could not be found.

*Nesoprosopis fuscipennis obscuripes* Perkins (1899: 107). Lectotype male here designated; wing length, 7.11 mm; "West Maui Mts., Iao Valley, Maui, Perkins, V.1896; B. M. Type Hym. 17a 140.

*Nesoprosopis haleakalae* Perkins (1899: 87–88). Lectotype male here designated; wing length, 4.59 mm; "Haleakala, Maui, 5000 ft, Perkins, X.1896"; B. M. Type Hym. 17a 122.

*Nesoprosopis hirsutula* Perkins (1899: 79–80). Lectotype male here designated; wing length, 5.16 mm; "Halemanu, Kauai, 4000 ft, Perkins, V.1895"; B. M. Type Hym. 17a 158b.

*Nesoprosopis hostilis* Perkins (1899: 104–105). Lectotype male here designated; wing length, 3.82 mm; "Waimea, Kauai, 3000 ft, Perkins, 2.1897"; B. M. Type Hym. 17a 167b.

*Nesoprosopis inquilina* Perkins (1899: 102–103). Lectotype male here designated; wing length, 4.88 mm; "Kau, Hawaii, 4000 ft, Perkins, XII.1896"; B. M. Type Hym. 17a 169a.

*Nesoprosopis insignis* Perkins (1899: 110–111). Lectotype male here designated; wing length, 6.29 mm (tip damaged); "Kau, Hawaii, 4000 ft, Perkins, VI.1895"; B. M. Type Hym. 17a 144b.

*Nesoprosopis kauaiensis* Perkins (1899: 90). Lectotype male here designated; wing length, 4.53 mm; "Mts. Waimea, Kauai, 4000 ft, Perkins, VI.1894"; B. M. Type Hym. 17a 162a.

Perkins' "type" male is now headless. Consequently, an alternative male was selected as lectotype from the other three males of the type series available in The Natural History Museum. At the time of writing the lectotype was not labeled with the B. M. type number, but that number was assigned to this name.

*Nesoprosopis koae* Perkins (1899: 85). Lectotype female here designated; wing length, 4.72 mm; "Honolulu, Oahu, Perkins, III.1897"; B. M. Type Hym. 17a 120.

*Nesoprosopis laeta* Perkins (1899: 81–82). Lectotype male here designated; wing length, 4.02 mm; "Waianae Mts., Oahu, Perkins, 2.1896"; B. M. Type Hym. 17a 134a.

*Nesoprosopis laticeps* Perkins (1899: 88–89). Lectotype male here designated; wing length, 5.36 mm; "Molokai Mts., 4000 ft, Perkins, IX.1893"; B. M. Type Hym. 17a 124b.

Perkins' "type" male is now headless. Consequently, the other male of the type series available in The Natural History Museum was selected as the lec-

totype. At the time of writing the lectotype was not labeled with the B. M. type number, but that number was assigned to this name.

*Nesoprosopis longiceps* Perkins (1899: 98). Lectotype male here designated (male and female mounted together); wing length, 4.34 mm; "Wailuku, Maui, Perkins, 1895"; B. M. Type Hym. 17a 160ab.

*Nesoprosopis mauiensis* Perkins (1899: 94–95). Lectotype male here designated; wing length, 3.58 mm; "Haleakala, Maui, 5000 ft, Perkins, 5.4.1894"; B. M. Type Hym. 17a 148.

*Nesoprosopis melanothrix* Perkins (1899: 86–87). Lectotype male here designated; wing length, 5.35 mm; "Haleakala, Maui, 5000 ft, Perkins, X.1896"; B. M. Type Hym. 17a 119b.

*Nesoprosopis mutata* Perkins (1899: 93). Lectotype male here designated; wing length, 3.65 mm; "Waimea, Kauai, 2000 ft+, Perkins, 2.1897"; B. M. Type Hym. 17a 164.

A discrepancy exists between the description that reads "Kauai (3000 ft)" and the label on the lectotype.

*Nesoprosopis neglecta* Perkins (1899: 89). Holotype female; wing length, 5.79 mm; "Molokai Mts., 4500 ft, Perkins, 21.9.1893"; B. M. Type Hym. 17a 125.

*Nesoprosopis nivalis* Perkins (1899: 83–84). Lectotype male here designated; wing length, 4.97 mm; "Haleakala, Maui, 9000 ft, Perkins, IV.1894"; B. M. Type Hym. 17a 136a.

*Nesoprosopis obscurata* Perkins (1899: 99). Lectotype male here designated; wing length, 4.84 mm (tip damaged); "Kona, Hawaii, Perkins, 8.1894"; B. M. Type Hym. 17a 151a.

*Nesoprosopis ombrias* Perkins (1910: 604–605). Lectotype male here designated; wing length 6.36 mm; handwritten "N. ombrias (male symbol), S. Kona, 3000 ft, Febr., RCLP," "RCLPerkins Collection," and the Bishop Museum label for Type No. (to be assigned).

*Nesoprosopis paradoxica* Perkins (1899: 111–112). Lectotype male here designated; wing length, 8.05 mm; "Kona, Hawaii, 4000 ft, Perkins, 22.7.1892"; B. M. Type Hym. 17a 141b.

*Nesoprosopis perspicua* Perkins (1899: 109). Lectotype male here designated; wing length, 6.29 mm; "Makaweli, Kauai, 2000 ft, Perkins, 2.1897"; B. M. Type Hym. 17a 143b.

The description reads "Mountains of Kauai about 3000 ft (January 1897)," but all labels on five other specimens of the type series in the Bishop Museum agree with the lectotype.

*Nesoprosopis psammobia* Perkins (1911: 72). Lectotype female here designated; wing length, 4.21 mm; handwritten on cork mounting block "Hilo coast, VI.190 (illegible 3 ?) R. C. L. Perkins, N. psammo-bia P.," "RCLPerkins Collection," and the Bishop Museum label for Type No. (to be assigned).

Three females are mounted on the same block of which only the lectotype has the abdomen intact.

*Nesoprosopis pubescens* Perkins (1899: 107–108). Lectotype male here designated; wing length, 7.55 mm; "Hilo, Hawaii, 2000 ft, Perkins, 1.1896"; B. M. Type Hym. 17a 139a.

*Nesoprosopis rugulosa* Perkins (1899: 84). Lectotype female here designated; wing length, 4.84 mm; "Kau, Hawaii, 4000 ft, Perkins, VI.1895"; B. M. Type Hym. 17a 2750.



*Nesoprosopis setosifrons* Perkins (1899: 108–109). Lectotype male here designated; wing length, 6.23 mm; “Kau, Hawaii, 4000 ft, Perkins, VI.1895”; B. M. Type Hym. 17a 142a.

*Nesoprosopis simplex* Perkins (1899: 79). Lectotype male here designated; wing length, 4.97 mm; “Kau, Hawaii, 4000 ft, Perkins, XII.1896”; B. M. Type Hym. 17a 157b.

*Nesoprosopis specularis* Perkins (1899: 93–94). Holotype female; wing length, 3.84 mm; handwritten: “Kilauea 1896”; B. M. Type Hym. 17a 2751.

*Nesoprosopis sphecodoides* Perkins (1899: 105–106). Lectotype male here designated; wing length, 4.53 mm; “Kau, Hawaii, 4000 ft, Perkins, XII.1896”; B. M. Type Hym. 17a 137b.

*Nesoprosopis unica* Perkins (1899: 88). Holotype male; wing length, 4.72 mm; “Honolulu Mt., Oahu, 2000 ft, Perkins, 1896”; B. M. Type Hym. 17a 123.

A discrepancy exists between the description that reads “mountains near Honolulu at an elevation of about 2500 ft (1897)” and the label on the holotype.

*Nesoprosopis vicina* Perkins (1899: 84–85). Lectotype female here designated; wing length, 4.65 mm; “Puna, Hawaii, Perkins, XII.1896”; B. M. Type Hym. 17a 118.

*Nesoprosopis volcanica* Perkins (1899: 83). Lectotype male here designated; wing length, 4.91 mm; “Kau, Hawaii, 4000 ft, Perkins, XII.1896”; B. M. Type Hym. 17a 135a.

5. *Species group names proposed by F. Smith.*—The same descriptions were published in Smith (1879a, 1879b). Except for *P. anthracina* and *P. flavipes* from the voyage of Captain Beechey, the rest of the Hawaiian bees described by Smith were sent to him by Blackburn. The shipment was accompanied by field notes corresponding to numbers on the specimens. As noted above, Smith’s descriptions appeared posthumously (see preface, 1879b). Later, Blackburn (1880) expressed his displeasure with the handling of his specimens and sought assistance from Kirby in London to set the record straight. From memory, Blackburn composed another copy of his field notes for Kirby. Parts of the notes are included by Kirby (1880: 85) along with the field numbers. The numbers were written on the cards on which the bees were mounted and are given below. Most specimens also have the accession number “79-40” which corresponds to the entry of six manuscript names for native bees presented by T. Blackburn from the Sandwich Islands (Anonymous 1864–1881).

*Prosopis anthracina* Smith (1853: 23). Lectotype female here designated; wing length, 4.06 mm; “Sandw. I. Beechey,” “anthracina Type Sm.”; B. M. Type Hym. 17a 172.

Both sexes were described, but only one female was found in the collection.

*Prosopis blackburni* Smith (1879a: 682). Lectotype male here designated; wing length, 3.74 mm; male marked “4” and female marked “5” on same card, “Maui 79-40”; B. M. Type Hym. 17a 2827ab.

Confusion has arisen because the specimens also bear a label “*Prosopis simillima* Sm Type.” The lectotype designated here matches Smith’s description of *P. blackburni* and not his description of *P. simillima* (1879b: 26) from Moreton Bay. The type of the latter species has been identified elsewhere in the collection and assigned the label B. M. Type Hym. 17a 46 (Houston 1981: 27).

*Prosopis facilis* Smith (1879a: 683). Lectotype male here designated; wing length,

4.53 mm; male marked "6," and female marked "7" on same card, "Maui 79-40," "Prosopis facilis (Type) Sm.;" B. M. Type Hym. 17a 154ab.

Blackburn (1886: 43) states the true type locality is Pauoa Valley, Oahu.

*Prosopis flavipes* Smith (1853: 23). Holotype male; wing length, 4.02 mm; "Sandw. I. Beechey," "flavipes Sm. Type"; B. M. Type Hym. 17a 153.

*Prosopis fuscipennis* Smith (1879a: 682–683). Holotype male; wing length, 7.67 mm; specimen marked "9," "Oahu 79.40," "Prosopis fuscipennis Type Sm." B. M. Type Hym. 17a 155.

Smith mentions characters of the female as noted by Blackburn (1880), but according to accession 79-40 (Anonymous 1864–1881) only one specimen, presumably the male, was sent to Smith.

*Prosopis hilaris* Smith (1879a: 683). Holotype male; wing length, 4.14 mm; specimen marked "8," "Maui 79-40," "Prosopis hilaris (Type) Sm.;" B. M. Type 17a 171.

*Prosopis volatilis* Smith (1879a: 683–684). Holotype male; wing length, 4.15 mm; specimen marked "25," "Kauai 79.40," "Prosopis volatilis (Type) Sm.;" B. M. Type 17a 152.

Confusion of this name with a type specimen from Australia was resolved by Houston (1981: 50).

6. *Species group name proposed by P. H. Timberlake.* — Only a single Timberlake name is treated here.

*Nesoprosopis perkinsiana* Timberlake (1926: 22–23). Holotype male; B. P. Bishop Museum Type Cat. No. 226.

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